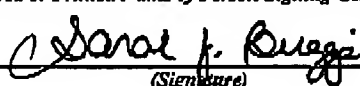
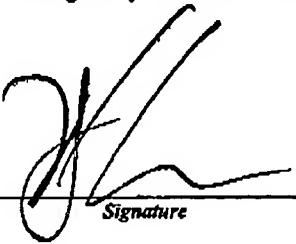
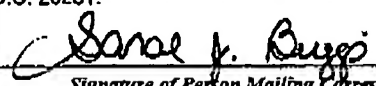


CERTIFICATE OF TRANSMISSION BY FACSIMILE (37 CFR 1.8) Applicant(s): Christian J. Wittak et al.			Docket No. 2001-0092-01	
Serial No. 10/036,676	Filing Date December 21, 2001	Examiner L. Al Nazer	Group Art Unit 2828	
Invention: FOUR KHz GAS DISCHARGE LASER SYSTEM				
13 Pages Being Transmitted				
I hereby certify that this <u>Amendment B & Four Terminal Disclaimers</u> (Identify type of correspondence) is being facsimile transmitted to the United States Patent and Trademark Office (Fax. No. <u>(703) 872-9306</u>) on <u>February 24, 2004</u> (Date)				
<div style="text-align: center;">Sarah J. Briggs (Typed or Printed Name of Person Signing Certificate)  (Signature)</div>				
<div style="text-align: right;">RECEIVED CENTRAL FAX CENTER FEB 24 2004</div> <div style="text-align: center;">Note: Each paper must have its own certificate of mailing.</div> <div style="text-align: right;">OFFICIAL</div>				

TRANSMITTAL LETTER (General - Patent Pending)			Docket No. 2001-0092-01
In Re Application Of: Christian J. Wittak et al.			
Serial No. 10/036,676	Filing Date December 21, 2001	Examiner L. Al Nazer	Group Art Unit 2828
Title: FOUR KHz GAS DISCHARGE LASER SYSTEM			
<p style="text-align: center;"><u>TO THE COMMISSIONER OF PATENTS AND TRADEMARKS:</u></p> <p>Transmitted herewith is:</p> <p>Amendment B; Four (4) Terminal Disclaimers; and Certificate of Transmission By Facsimile</p> <p>in the above identified application.</p> <p><input type="checkbox"/> No additional fee is required.</p> <p><input type="checkbox"/> A check in the amount of _____ is attached.</p> <p><input checked="" type="checkbox"/> The Commissioner is hereby authorized to charge and credit Deposit Account No. 03-4060 as described below. A duplicate copy of this sheet is enclosed.</p> <p style="margin-left: 40px;"><input checked="" type="checkbox"/> Charge the amount of \$440.00</p> <p style="margin-left: 40px;"><input checked="" type="checkbox"/> Credit any overpayment.</p> <p style="margin-left: 40px;"><input checked="" type="checkbox"/> Charge any additional fee required.</p> <div style="margin-top: 20px;"> _____ Signature</div> <p style="text-align: right; margin-top: 20px;">Dated: February 24, 2004</p> <div style="margin-top: 20px;">William C. Cray, Reg. No. 27,627 Cymer, Inc. Legal Department - M/S 4-2C 17075 Thornmint Court San Diego, California 92127-2413 Telephone: (858) 385-7185 Facsimile: (858) 385-6025</div>			
CC:		<div style="border: 1px solid black; padding: 5px;"><p>I certify that this document and fee is being deposited on 2/24/04 with the U.S. Postal Service as first class mail under 37 C.F.R. 1.8 and is addressed to the Commissioner of Patents and Trademarks, Washington, D.C. 20231.</p><p style="text-align: center;"> Signature of Person Mailing Correspondence</p><p style="text-align: center;">Sarah J. Briggs Typed or Printed Name of Person Mailing Correspondence</p></div>	

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USSN 10/036/676
Atty. Docket No. 2001-0092-01

<p align="center">CERTIFICATE OF MAILING BY "FACSIMILE"</p> <p>Date of Deposit: February 24, 2004</p> <p>I hereby certify that this paper or fee is being sent via facsimile at (703) 872-9306 to Addressee services under 37 C.F.R. 1.8 on the date indicated above and is addressed to the Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.</p> <p>Sarah J. Briggs (Typed or Printed Name of Person mailing papers or fees)</p> <p><i>Sarah J. Briggs</i> (Signature of Person mailing papers or fees)</p>
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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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FEB 24 2004

OFFICIAL

In re Application of:

Christian J. Wittak, et al.

Serial No.: 10/036,676

Filing Date: December 21, 2001

Title: **FOUR KHz GAS DISCHARGE LASER
SYSTEM**

Examiner: L. Al Nazer

Group Art Unit: 2828

AMENDMENT B

Mail Stop Non-Fee Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

Responsive to the Office Action mailed December 19, 2003, please amend the above captioned application as follows:

Claims 1-68 are pending in the above captioned patent application. Claims 1-68 have been rejected. The present response should render the Examiner's reasons for rejecting claims 1-68 improper and the Examiner is respectfully requested to withdraw the rejection of claims 1-66 (as amended) and allow claims 1-66.

Claims 61 and 62 have been rejected since they were not submitted with the Amendment filed on November 13, 2003. This obvious typographical error has been corrected by renumbering the claims 63-68 to 61-66 and correcting the dependencies in

USSN 10/036/676
Atty. Docket No. 2001-0092-01

antecedent bases as appropriate. Such amendment is for the sole purpose of correcting the obvious typographical error and not for the purpose of defining over any prior art or otherwise narrowing or changing the scope of any amended claim.

Claims 1, and 47 have been rejected for so-called obviousness double patenting.¹ The Examiner has taken the position that claim 1 claims the same invention as claims 1 in the copending applications 10/056,619, 10/187,336, and 10/210,761, each of which are asserted to contain "all the elements and structural connection recited in claim 1 of the present application. The Examiner has also taken the position that claim 47 of the above captioned application likewise constitutes obviousness double patenting over claim 22 in the copending application 09/854,097, and claim 24 of the copending application 10/187,336. In addition, the Examiner has taken the position that claim 47 of the above captioned application also constitutes obviousness double patenting over claim 22 of United States Patent No. 6,442,181. With the exception of the double patenting assertion with respect to the '181 patent, the double patenting rejections have been made provisionally.

Applicants respectfully traverse the above noted double patenting rejections in that applicants do not agree that either of claims 1 or 47 is obvious in light of the referenced copending and issued claims. However, applicants have filed with this Response terminal disclaimers over the referenced copending applications and issued patent.

For that reason, the Examiner's rejection of claims 1 and 47 for obviousness double patenting is rendered improper and the Examiner is respectfully requested to withdraw the rejection of claims 1 and 47 and allow claims 1 and 47.

Claims 1-68 have been rejected under 35 U.S.C. §112, first paragraph, as not being enabled. The Examiner has taken the position that the claims contain "subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention." The Examiner states that "[i]ndependent claims 1 and 47 recite the

¹ The Examiner has incorrectly used the comment paragraphs pertaining to so-called "statutory double patenting", which can not be cured by a terminal disclaimer. However, the specific rejections state that the basis is "obviousness-type double patenting," which applicants assume is the actual basis for rejection.

USSN 10/036/676
Atty. Docket No. 2001-0092-01

phrase 'gas discharges per second.' This phrase is not properly defined in the specification."

Applicants respectfully traverse the rejection based upon lack of enablement.² The specification is replete with references to the fact that the gas discharge laser is one in which the output pulse repetition rate, stated to be in Hz, i.e., cycles or repetitions per second, is the same as the pulse repetition rate stated as 4000 pulses per second, and results from gas discharges between the electrodes in the laser chamber occurring at the rate of 4000 gas discharges per second or 4000Hz, i.e., one gas discharge in the laser chamber, per output laser pulse, from the laser. Therefore, 4000 gas discharges per second between the electrodes in each chamber results in 4000 laser output light pulses per second from the laser. Further, it is clear that gas discharges resulting from applying an electrical pulse to the electrodes (at a certain electrical pulse application rate, e.g., 4000 electrical pulses per second or 4000Hz) is a proper terminology to be used in regard to a gas discharge laser, e.g., an ArF, or KrF or molecular fluorine gas discharge laser.

Even if the Specification was unclear on this point, which it is not, the prior art is also replete with references to the fact that gas discharge lasers of the type described in the above captioned application, e.g., molecular fluorine gas discharge lasers and ArF or KrF gas discharge lasers, operate as just described and the gas discharge rate in the chamber as described in the Specification of the above captioned application (expressed in laser output pulses per second or Hz) is identical to (1) the number of electrical pulses per second applied to the electrodes in the laser chamber, (2) the number of resulting gas discharges occurring in the laser chamber per second occurring in a gas discharge region between the electrodes, and (3) the number of resulting laser output light pulses per second coming from the laser due to the same number of occurring gas discharges.

² In a related application another Examiner for which Examiner Ip is also the supervisory patent Examiner, has made this rejection based on indefiniteness, i.e., that the phrase "gas discharges per second" is not the same as the disclosed pulse repetition rate of 4000 pulses per second or 4000 Hz. Applicants do not understand the current rejection to be any different. That is to say, if the phrase is adequately described in meaning in the Specification, then the Applicants do not understand the Examiner to require anything in addition in the nature of enablement, i.e., that the laser system will function as described. Therefore, applicants herein respond to the "lack of enablement" rejection with an explanation of how the Specification defines the meaning of the term "gas discharges per second" in the context of how the claimed laser system works.

USSN 10/036/676
Atty. Docket No. 2001-0092-01

The Abstract of the above captioned patent application itself equates laser output light pulses with gas discharges and equates Hz to laser output light pulse repetition rate. The Abstract states:

The present invention provides an excimer laser capable of producing a high quality **pulsed laser beam at pulse rates of about 4,000 Hz** at pulse energies of about 5 mJ or greater. A preferred embodiment is an ArF excimer laser specifically designed as a light source for integrated circuit lithography. ... In a preferred embodiment two fan motors drive a **single tangential fan which provides sufficient gas flow to clear discharge debris from the discharge region during the approximately 0.25 milliseconds between pulses.** (Abstract)

The fan clears the gas after each gas discharge between the electrodes occurring at the rate of one every 0.25 milliseconds, i.e., at the disclosed 4KHz laser output pulsed laser beam repetition rate.

The Specification also states:

Electric discharge gas lasers are well known and have been available since soon after lasers were invented in the 1960s. A high voltage discharge between two electrodes excites a gaseous gain medium. ... Many of these electric discharge gas lasers are operated in a pulse mode. (P. 1, lines 13-18)

In addition, the Specification states that:

Excimer lasers are a particular type of electric gas discharge laser and have been known as such since the mid 1970s. A description of an excimer laser, useful for integrated circuit lithography, is described in U.S. Pat. No. 5,023,884 issued Jun. 11, 1991 entitled "Compact Excimer Laser." This patent has been assigned to Applicants' employer, and the patent is hereby incorporated herein by reference. The excimer laser described in U.S. Pat. No. '884 is a **high repetition rate pulse laser**. In FIGS. 1 and 2, the **principal elements** of the laser 10 are shown. (FIG. 1 corresponds to FIG. 1 and FIG. 2 corresponds to FIG. 7 in Patent '884.) The discharges 22 are between two long (about 23 inches) electrodes 18 and 20 spaced apart by about 5/8 inch. Repetition rates of prior art lasers, like the one described, are typically within the range of about 100 to 2000 pulses per second. These high repetition rate lasers are usually provided with a gas

USSN 10/036/676
Atty. Docket No. 2001-0092-01

circulation system. ... The fan blade structure is slightly longer than the electrodes 18 and 20 and provides sufficient circulation so that at pulse operating rates, the discharge disturbed gas between the electrodes is cleared between pulses. (p. 1, line 20 – p. 2, line 9)

Further, the Specification notes:

Electric discharge gas lasers of the type described in U.S. Pat. No. 5,023,884 utilize an electric pulse power system such as that described in FIG. 3 to produce the electrical discharges, between the two electrodes. [This produces] high voltage electrical potential in the range of about 16,000 volts across the electrode which produces the discharge which lasts about 50 ns. (p. 3, lines 4-16)

In addition, the Specification states:

This preferred embodiment is designed to operate at pulse repetition rates of 4,000. Clearing the discharge region of discharge affected gas between pulses requires a gas flow between the electrodes 18A and 20A of up to about 67 m/s. ... At a pulse rate of 4000 Hz, the discharge will add about 12 kw of heat energy to the laser gas. To remove the heat produced by the discharge along with the heat added by the fan four separate water cooled finned heat exchanger units 58A are provided. (p. 9, lines 10-20)

Further, the Specification notes:

Operation of laser systems in accordance with the present invention requires precisely controlled electrical potentials in the range of about 12,000 V to 30,000 V be applied between the electrodes at 4,000 Hz (i.e., at intervals of about 250 micro seconds). (p. 12, lines 15-18)

And further, states the Specification:

Prior to the need for a laser pulse the voltage on C-1 is charged to 600-800 volts and switches Q1-Q3 are open. (p. 15, lines 18-19)

Yet again the Specification notes:

Prior art excimer lasers used for integrated circuit lithography are subject to tight specifications on laser beam parameters. This has typically required the measurement of pulse energy, bandwidth and center wavelength for every

USSN 10/036/676
Atty. Docket No. 2001-0092-01

pulse and feedback control of pulse energy and bandwidth. ... For a 1,000 Hz system this means the measurement and the control for the next pulse must take less than {fraction (1/1000)} second. For a 4000 Hz system speeds need to be four times as fast. ...

Wavelength and bandwidths have been measured on a pulse to pulse basis for every pulse, but typically the feedback control of wavelength has taken about 7 milli-seconds because prior art techniques for controlling center wavelength have taken several milli-seconds. Faster control is needed. (p. 27, lines 10-28)

There are other references in the Specification that equate 4KHz to the repetition rate of the electrical pulses delivered by the pulse power system to the electrodes, causing the self-same gas discharge repetition rate between the electrodes induced by the applied electrical pulses at the specified rate, and the laser output light pulses at the also self-same 4000 Hz output pulse repetition rate. The above should be sufficient to indicate that the claimed laser is of the "gas discharge" type. That "gas discharge" induced by an electrical discharge between two electrodes, causes lasing and each gas discharge resulting from each electrical discharge causes an output laser light pulse. All of these occur at some pulse repetition rate, e.g., 4000 Hz, which is the same as the electrical discharge rate, the induced gas discharge rate and the output laser light pulse repetition rate.

Therefore, the phrase "gas discharges per second" is adequately and sufficiently described and its meaning is clear from the Specification as filed.

Similar disclosures in dozens of patents issued to Applicants' assignee Cymer Inc. contain similar references to the same operating parameters (single chamber or dual chamber).

For the above stated reasons, the Examiner's rejection of claims 1-68 under 35 U.S.C. §112 is improper and the Examiner is respectfully requested to withdraw the rejection of claims 1-68 and allow claims 1-68 (1-66 as amended).

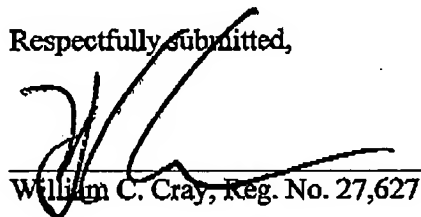
USSN 10/036/676
Atty. Docket No. 2001-0092-01

Conclusions

Claims 1-66 remaining in this application are in a condition for allowance and the Examiner is respectfully requested to allow claims 1-66.

Applicants' authorize the Commissioner to charge Cymer, Inc.'s Deposit Account No. 03-4060 the amount of \$440.00 for the four terminal disclaimer fees. Applicants do not believe any other fees are due in connection with this Response, however, if any fees are required, the Commissioner is authorized to charge any fees, or to credit any overpayment to Cymer, Inc.'s Deposit Account No. 03-4060.

Respectfully submitted,



William C. Cray, Reg. No. 27,627

February 24, 2004
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